

**Notice of Allowability**

Application No.

10/537,908

Applicant(s)

FURUUCHI, YUJI

Examiner

Anatoly Vortman

Art Unit

2835

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to application filed on 06/08/2005.
2. ☒ The allowed claim(s) is/are 1-4.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All b) ☐ Some\* c) ☐ None of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 6/8/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

/Anatoly Vortman/  
Primary Examiner  
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### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In the **Abstract**: p. 18, line 19, following "underlying insulating layer." The clause [Alternatively, it is preferable that there is a height differential between the upper surfaces of the pair of low-melting metal member electrodes, and the low-melting metal member is inclined between the pair of low-melting metal member electrodes.7] has been deleted in order to meet the 150-word requirement (MPEP 608.01(b) [R-3]).

In the **Claims**: claim 1, line 6 of the claim, in order to provide proper antecedent, [the] has been replaced with --a-- before "underlying base".

2. The following is an examiner's statement of reasons for allowance:

The allowability resides in the overall structure of the device as recited in a sole independent claim 1, and at least in part, because claim 1 recites: "when  $S$  ( $\mu\text{m}^2$ ) is the surface area of a lateral cross section of the low-melting metal member between a pair of low-melting metal member electrodes sandwiching said region, and  $H$  ( $\mu\text{m}$ ) is the height at which the suspended region is suspended, then  $H/S \geq 5 \times 10^{-5}$ ". The aforementioned limitations in combination with all remaining limitations of claim 1 are believed to render the claim and all claims dependent therefrom patentable over the art of record. Further, Applicant has shown a

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criticality of the claimed range of H/S by comparing sufficient number of tests inside and outside said range (see Table 1 on p. 15). Specifically, Applicant has proved that unexpected result was achieved during the experimentation, by showing that comparative examples 1 to 5 with  $H/S < 10^{-5}$  did not have consistent spherical segmentation of the low-melting metal member during the melting of the low-melting metal member and had an operating time at least 1.4 times longer than examples 1 to 7 in which H/S was at least  $10^{-5}$  and which had consistent spherical segmentation of the low-melting metal member.

JP/2001-325868, JP/2001-325869, JP/2000-306477 (all of record) and US/6452475, are believed to be the closest references to the present invention, disclosed a protection element comprising a heating element and a low-melting-point metal element on a substrate, wherein the low-melting-point metal element is fused by heating of the heating element, and there is a region in which the low-melting-point metal element is suspended from a base, but did not disclose that when S ( $\mu\text{m}^2$ ) is the surface area of a lateral cross section of the low-melting metal member between a pair of low-melting metal member electrodes sandwiching said region, and H ( $\mu\text{m}$ ) is the height at which the suspended region is suspended, then  $H/S \geq 5 \times 10^{-5}$  as recited in claim 1 of the instant application.

Furthermore, Examiner has made of record and listed on PTO-892 additional references teaching various electrical fuses comprising low-melting metal members formed on substrates, some of them having heat-generating members. None of said references disclosed the aforementioned features recited in claim 1.

None of the references of record taken either alone or in combination is believed to render the present invention unpatentable as claimed.

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3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anatoly Vortman whose telephone number is 571-272-2047. The examiner can normally be reached on Monday-Friday, between 10:00 am and 6:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Jayprakash Gandhi can be reached on 571-272-3740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Anatoly Vortman/  
Primary Examiner  
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